

R E M A R K S

This is in response to the Office Action mailed October 10, 2001. In view of the foregoing amendments and following representations, reconsideration is respectfully requested.

Initially, on page 2 of the Office Action, the drawings are objected to under 37 C.F.R. 1.83(a). This objection is strenuously traversed for the following reasons.

37 C.F.R. 1.83(a) states:

"The drawing in a non-provisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where the detailed illustration is not essential for a proper understanding, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation (e.g., the labeled rectangular box)."

It is submitted that the drawing adequately illustrate each feature specified in the claims. It appears that the Examiner has taken the position that the functional capabilities of the features must also be illustrated in the drawings. Initially, it is submitted that an illustration of how component supply table is replaced is not necessary or essential for a proper understanding of the claimed invention. It is noted that all structural details required in each of the pending claims is adequately illustrated in the present drawings. Accordingly, the Examiner is requested to withdraw the objection to the drawings.

In the event that the Examiner decides to maintain the drawing objection, then Applicant's would be willing to submit drawing similar to the exhibits submitted with the response filed on September 4, 2001.

Further, in the objection, the Examiner also states "the mounting process must be shown or the feature(s) canceled from the claim(s)." What is the mounting process recited in the claims? The Examiner's attention is directed to the fact each of claims 15-20 are directed to a component mounting apparatus, and not a mounting process. Furthermore, it is noted that process or method applications are a class of invention that generally do not require drawings. As a matter of fact, MPEP 601.01(f) instructs that it is PTO practice to treat an application claiming a process or method as an application for which a drawing is not necessary for an understanding of the invention. Drawings are generally not necessary to illustrate a claimed process when the application includes adequate illustrations of the apparatus. In any event, the component mounting process is illustrated in Fig. 4.

In view of the above, the Examiner is requested to withdraw the objection to the drawings.

* * * * *

Next, on pages 2-3 of the Office Action, claims 15-20 are rejected under 35 U.S.C. § 112, first paragraph as containing subject matter which was not described in the specification in such

a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention.

Initially, it is submitted that it is inherent that a component supply table, which is mounted on casters, can be removed to permit replacement with a new component supply table (see page 15, lines 18-21).

With regard to the language added to claims 15 and 18, support can be found, for example, on page 19, lines 1-4 of the specification, as originally filed.

With regard to new claim 19, support can be found on page 23, lines 8-14 of the specification, as originally filed.

With regard to new claim 20, support can be found on page 12, lines 4-25 and page 23, lines 8-14 of the specification, as originally filed.

In view of the above, it is submitted that the newly added limitations, as well as the newly added claims, are adequately supported by the specification, as originally filed.

Accordingly, the Examiner is requested to withdraw the rejection of claims 15-20 under 35 U.S.C. § 112, first paragraph.

* * * * *

Next, on page 3 of the Office Action, claims 15-20 are rejected under 35 U.S.C. § 112, second paragraph. In the explanation of the rejection, the Examiner makes the general

allegation that "numerous phrases and clauses in the claims are vague and indefinite and/or awkwardly and confusingly worded". The Examiner sets forth the following two specific examples.

1. The limitation "on one of the sides from the one side of the board mounting position" renders the claims vague and indefinite.

2. The limitations "the other of the component supply tables" and "the other of the first and second mounting head sections" renders the claim vague and indefinite. The Examiner contends that these features lack positive antecedent basis.

In view of the above, claims 15 and 18 have been extensively amended to avoid any confusion. In particular, claim 15 has been amended to clarify the that one of the component supply tables is can be removed from one of sides of the board mounting position to permit a new component supply table to be installed in the vacated position.

With regard to the second identified problem, the other of the component supply tables refers to one of the pair of positively recited component supply tables (see line 2 of claim 15). This follows from the second paragraph of claim 15 which recites that a first mounting head section picks up components from one of the component supply tables. The fourth paragraph recites that the second mounting head picks up components from the other of the component supply tables. It is submitted that the revised claim

language should avoid any further confusion, particularly since only two supply tables are positively recited. Note that the definite requirements of 35 U.S.C. § 112, second paragraph are met if those skilled in the art would understand what is being claimed. Amgen Inc. v. Chugai Pharmaceutical Co., Ltd., 18 USPQ 2d 1016, 1030 (Fed. Cir. 1991).

Further, the Examiner concludes this rejection by indicating that the confusion and uncertainty of the claims renders it impossible to compare the claims to the prior art. In view of the revisions made to claims 15-20, and the fact that the previous Office Action represented the fourth action on the merits of the present application, it would appear that the claims can now be compared with the prior art. Should the Examiner continue to consider the claims to be indefinite, then the Examiner is respectfully requested to contact Applicant's undersigned attorney by telephone in order to discuss the claim language.

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The following comments are presented for the Examiner's consideration (please refer to exhibits I-II which accompanied the response filed on September 4, 2001).

On pages 2-3 of the Office Action, claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker (U.S. Patent No. 5,323,528) in view of Asai et al. (U.S. Patent No. 5,711,065) and further in view of Mori et al. (U.S. Patent No.

5,456,001). Also, on page 4-5 of the Office Action, claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker (U.S. Patent No. 5,323,528) in view of Asai et al. (U.S. Patent No. 5,711,065) and further in view of Onodera (U.S. Patent No. 5,741,114).

It is submitted that the present invention, as embodied by claims 15-22, now clearly distinguishes over the collective teachings of Baker, Asai, Mori and Onodera for the following reasons.

To clearly distinguish over the applied prior art references, claims 15 and 17-20 have been amended and new claims 21-22 have been added. A copy of the amended portion of the claims with changes marked therein is attached and entitled "Version with Markings to Show Changes Made."

In the present invention, components that are supplied by component supply means, provided on a pair of component supply tables, are mounted onto a board by first and second mounting heads. With the arrangement claimed in claims 15 and 18, components supplied from one of the component supply tables can be mounted on a board by a first mounting head, while the components supplied from the other of the component supply tables are mounted on the board by the second mounting head. However, in the event of a component shortage at either one of the component supply tables,

components can continue to be supplied from the other component supply table and mounted on the board by the corresponding mounting head. Thus, components can be replenished without the necessity of stopping the component mounting operation.

In the present invention, since the entire component supply table, which is arranged on one of the sides of a board mounting position, can be replaced with a new component supply table, the replacement work can be accomplished simply, quickly, and safely.

Specifically, as shown in Figs. A-C of Exhibit I (attached hereto), each of the component supply tables 28A is provided with component supply means comprised of parts cassettes provided with reels. As shown in Fig. B, one of the component supply tables 28A-1 lacks the required components, and is subsequently removed and replaced with a new component supply table 28A-2, which is supplied with the required components. During the replacement of the component supply table 28A-1 with the new component supply table 28A-2, the lower head 31-2 continues to operate for the purpose of mounting components on the board 37 while the upper head 31-1 is stopped (see Fig. B). This arrangement is specifically set forth in dependent claim 19 and 21.

Further, as shown in Figs. D-E of Exhibit II, when the components are mounted on different types of boards, for example, 37-1 and 37-2, one of the component supply tables 28A-1 is provided with the components required for board type 37-1. At the same

time, the other component supply table 28A-3, is provided with the components required for board type 37-2. Accordingly, the mounting heads 31-1, 31-2 can operate at the same time to mount components on different types of boards. This arrangement is specifically set forth in dependent claims 20 and 22.

Note, if only one of the plural parts cassettes on one side is replaced for a new one, it is difficult to perform the replacement operation because the parts cassette must be removed from, and inserted into, a small space between adjacent cassettes which makes the positioning of the replacement parts cassette difficult and quite dangerous. Further, if a plurality of the parts cassettes, located on one side, are to be replaced with new ones, the removing and inserting operations must be repeated for each parts cassette, and thus a long period of time is necessary to perform the necessary replacements. Furthermore, when the components are to be mounted on a plurality of types of boards, in some cases, several parts cassettes on one side must be replaced with new ones which takes a long period of time. In addition to the above, the parts cassettes tends to become shifted or bent, which further complicates the process of inserting a new cassette.

However, due to the novel component mounting apparatus of the present invention, the above-described problems are eliminated because the entire component supply table, which includes all of

the parts cassettes arranged on one side, can be replaced with a new component supply table.

Clearly, the cited references fail to teach or suggest an arrangement in which the component supply table is removable to permit replacement with a new component supply table.

In particular, **Baker** discloses a component placement machine, which requires that, when a component shortage occurs at any one of the cassettes, the placement machine must be stopped in order to permit the depleted cassette to be exchanged with a new cassette. Accordingly, a continuous mounting operation cannot be carried out in the event of a component shortage.

Mori merely discloses an exchange of cassettes, but fails to disclose or suggest a component supply table having components that can be replaced without adversely effecting the component suction and mounting operations.

Asai merely discloses the use of only a single head. Furthermore, Asai fails to disclose or suggest an arrangement that permits a component supply table to be replaced without adversely affecting the component suction and mounting operations. Asai does disclose a plurality of carts, which each support a group of

component supplying cartridges 290. However, the carts 294 are provided on one side of the component mounting position, and thus a continuous component mounting process can not be ensured. Further, although **Asai** discloses four carts 294 mounted on casters 296, and that one of the four carts 294 can be removed and a new cart inserted, the adjacent carts are subject to being shifted or bent, thus making it difficult to perform the necessary replacement operations.

Onodera is cited by the Examiner to teach a pair of inverted U-shaped support frames. Onodera, however, does not disclose or suggest a component mounting apparatus that would permit replacement of a group of parts cassettes as in the component mounting apparatus defined in claims 15 and 18 of the present invention.

Accordingly, it is submitted that the collective teachings of Baker, Mori, Asai and Onodera do not disclose or suggest the present invention, as defined in claims 15 and 18.


In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for

allowance, then the Examiner is requested to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

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In the Claims:

Please amend the claims as follows:

15. (Thrice Amended) A component mounting apparatus comprising:

a pair of component supply tables for accommodating a plurality of components, said component supply tables being arranged on opposite sides of a board mounting position,

each of said component supply tables being supported on casters so as to be movable between support frames toward and away from ^{lat} (the respective side) [opposite sides] of the board mounting position and replaceable by [moving] being removed from the respective [one of the component supply tables, which is arranged on one of the sides from the one] side of the board mounting position[, and thereafter fixedly installing] so that (a new component supply table) ^{lat} ^{dr} for accommodating (a plurality of components) can be positioned at ^{lat} (the side of the board mounting position) vacated by (one of the component supply tables) [in a specified position of the one side so as to replace the one component supply table with the new component supply table]; and

(a first mounting head section) for successively picking up [the plurality of] components at ^{dr} (one of the component supply tables), thereafter moving to a board positioned at the board mounting position, and thereafter successively mounting the [plurality of] picked-up components onto the board while moving in first and second directions which are perpendicular to each other,

wherein the first direction is perpendicular to a board transfer direction in which the board is transferred, and the second direction is located along the board transfer direction,

a second mounting head section for successively picking up [the plurality of] ^{dr} components at ^{lab dr} (the other of the component supply tables,) thereafter moving to the board positioned at the board mounting position, and thereafter successively mounting the [plurality of] picked-up components onto the board while moving in third and fourth directions which are perpendicular to each other,

wherein the third direction is parallel to the first direction, and the fourth direction is parallel to the second direction but is not necessarily the same direction as the second direction,

wherein (each of the first and second mounting head sections is independently movable between one of the component supply [table] tables and the board,) and [one of the first and second mounting head sections is movable between the other of the component supply tables and the board] while one of the [other of the] first and second mounting head sections is stopped for [the] a replacement of one of the component supply tables with [the] a new component supply table, the other of the first and second mounting head sections is movable between the other of the component supply tables and the board.

17.(amended) The component mounting apparatus according to claim 16, wherein component take-out positions of the component supply tables are positioned along [in] a straight line extending along a board transfer path [where] along which the board is transferred.

18. ^{Twice} (Amended) A component mounting apparatus comprising:
a base structure;

a pair of inverted U-shaped support frames positioned on said base structure in a parallel relationship and on opposite sides of a board mounting position, wherein a board transfer path extends through openings in said U-shaped support frames;

[a pair of component supply tables removably secured between said support frames on opposite sides of the board transfer path, each of said component supply tables accommodating a plurality of components,]

a first component supply table supported on a plurality of casters and removably secured between said support frames on a first side of the board transfer path,

a second component supply table supported on a plurality of casters and removably secured between said support frames on a second side of the board transfer path, wherein each of said first and second component supply tables accommodates a plurality of components,

wherein each of said component supply tables [includes

a plurality of casters for allowing the component supply tables to] can be moved in a perpendicular direction toward and away from the board transfer path;

a first mounting head section for successively picking up a plurality of components at [one of] the first component supply table [tables], thereafter moving to a board positioned at the board mounting position, and thereafter successively mounting the plurality of picked-up components onto the board while moving in first and second perpendicular directions, wherein the first direction is perpendicular to the board transfer direction,

a second mounting head section for successively picking up a plurality of components at the second [other of the] component supply table [tables], thereafter moving to the board positioned at the board mounting position, and thereafter successively mounting the plurality of picked-up components onto the board while moving in third and fourth directions which are perpendicular to each other, wherein the third direction is parallel to the first direction,

[wherein each of the first and second mounting head sections is independently movable between the component supply tables and the board,]

wherein the first and second mounting head sections are independently movable between the board and the first and second component supply tables, respectively,

wherein the second mounting head section is movable

between the [other] second component supply table and the board while the first mounting head section is stopped for the purpose of replacing the first [one] component supply table with [the] a new component supply table.

19. (Amended) The component mounting apparatus according to claim 15, wherein each of the component supply tables is [a component supply table] provided with component supply means comprised of parts cassettes provided with reels, and when one of the component supply tables does not have [has no required] components required for a mounting operation, it can be replaced with a new component supply table provided with the required components [and includes all of the parts cassettes arranged on the one side while the new component supply table has the required components].

20. (Amended) The component mounting apparatus according to claim 15, wherein, when the components are mounted on a plurality of types of boards, one of the component supply tables, having components required for one of the types of boards, is used for the one type of board while the other of the component supply [table] tables [having components required for one of the other [the other of the types of boards,] is used for one of the other types [another type] of boards.

EXHIBIT I

Fig. C

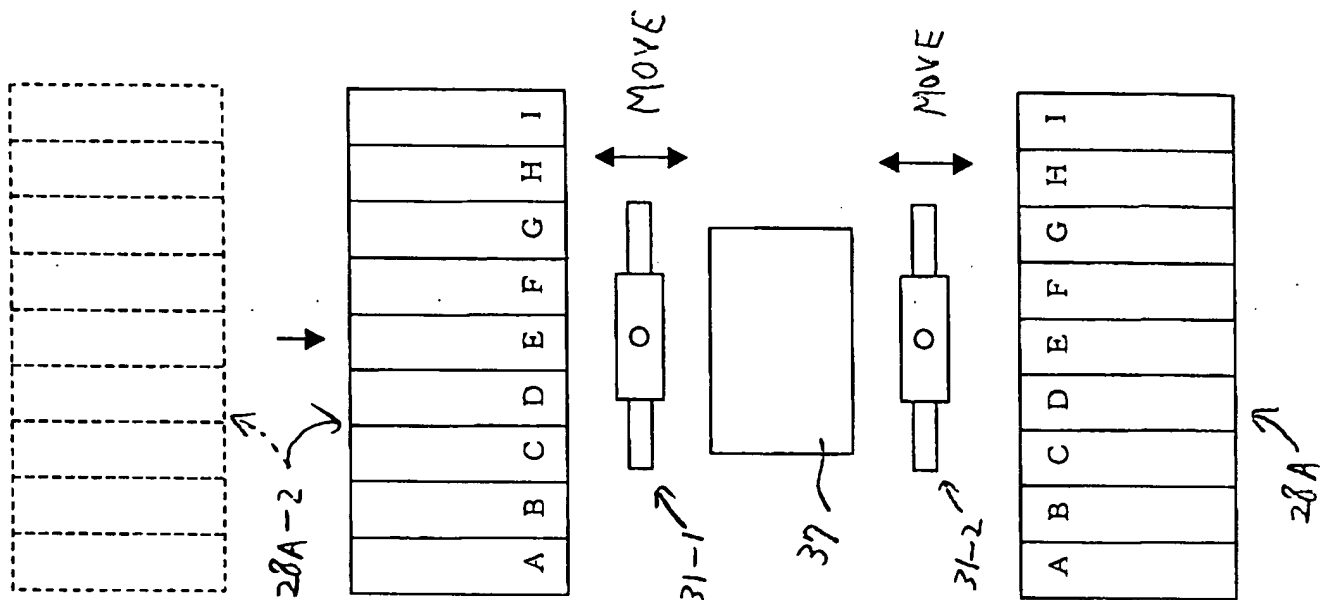


Fig. B

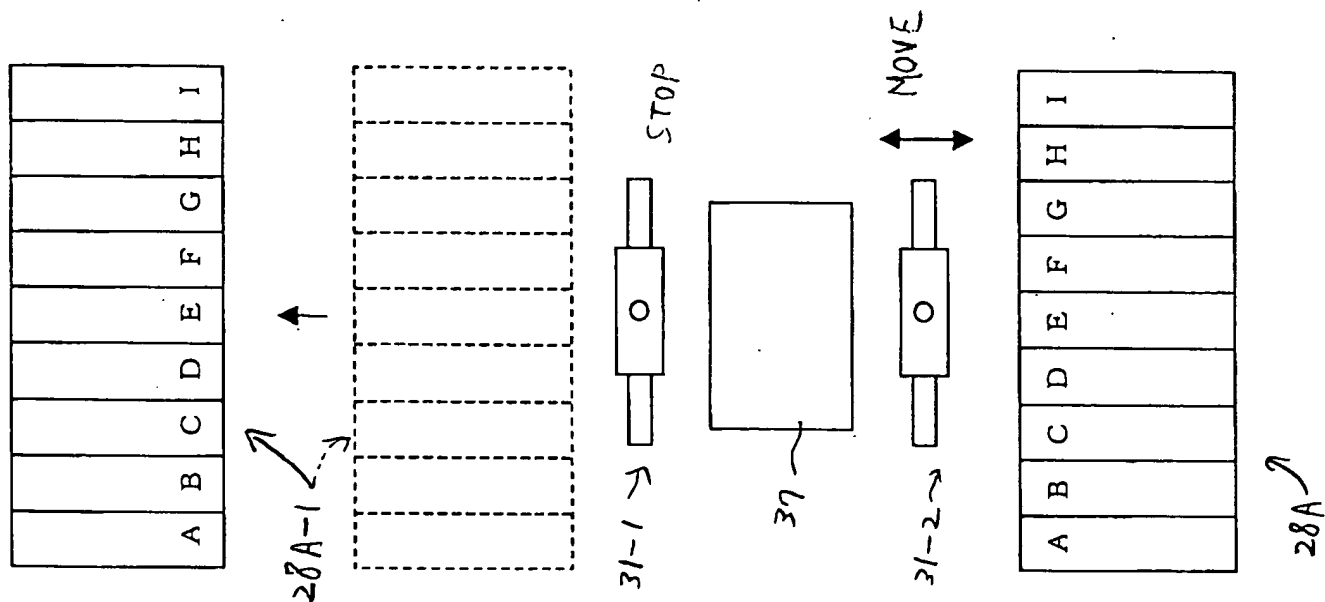


Fig. A

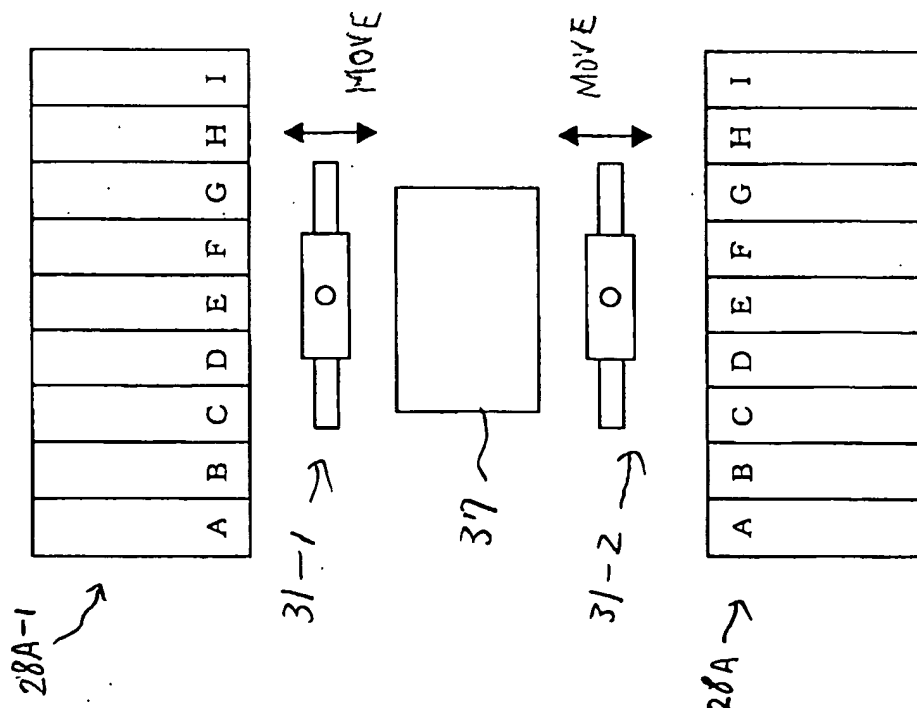


EXHIBIT II

Fig. D

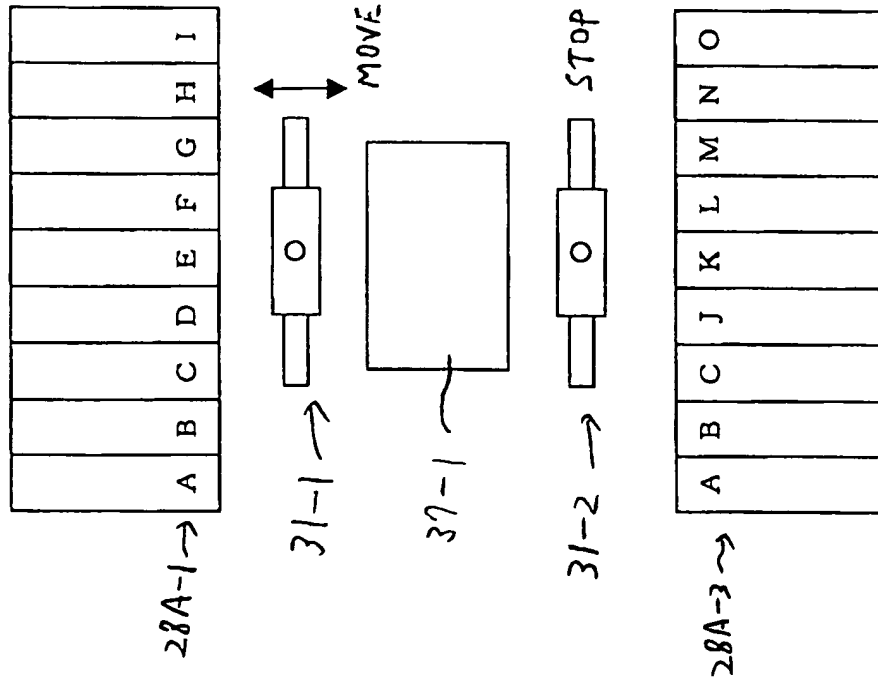


Fig. E

